International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 2018 vol.18 N1.1, pages 425-432

Reconstruction physicochemical conditions frasnian-famennian carbonate deposits on electron paramagnetic resonance data

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© SGEM2018. The paramagnetic properties of core samples from the section of the reference well were performed on 62 samples (1478,1M – 1455,3м interval) Zadon's horizon Famennian period by electron paramagnetic resonance (EPR) for mineral associations of the of the Upper Devonian deposits of the Volga-Ural region of the Republic of Tatarstan. Thus, a complex of geochemical EPR parameters of rocks (Mn2+, Fe3+ in limestones, anionic complexes SO3, SO2, PO2, alfa = 15 * I (Mg)/I (Ca) ions Mn positions Mg/Ca in dolomite, C600), and logging for the work on the refinement of rhythms, stratigraphic cycles of Frasnian-Famenian carbonate deposits.. The main feature of the structure of the Zadon's horizon is that, in addition to dolomites, dolomites calcareous and calcareous, dolomite and dolomite limestones are involved in the formation of carbonate rocks. Separate interlayers contain only limestones. The phosphate component is contained only in the dolomites, which are confined to the packs containing anhydrite, and is of the same nature as in the Liven's and Evlan's horizons: the interval 1472.9 m-1470.4 m. This cycle indicates that the initial stage of the transgressive cycle was unstable and stabilized, starting at 1460.1 m. It is shown that the formation of reservoir properties of rocks in the section under study is due to both superposed tectonic factors and primary sedimentation characteristics of rocks. The regressive cycle is distinguished by the fact that in the Frasnian stage upwards in the section the carbonates are enriched in manganese as the basin is shoaling (the regularity of Ronov AB). The boundaries of the rhythms are marked by samples in which the ion concentrations of the PO2-, SO3- anhydrite radicals are increased, as well as low values of the parameter alfa and the content of Mn2+ ions.

http://dx.doi.org/10.5593/sgem2018/1.1/S01.054

Keywords

Anhydrite, Dolomite, Electron paramagnetic resonance (EPR or ESR), Limestone, Organic matter, Zadon's horizon

References

[1] Kuznetsov V.G., Evolution of carbonate accumulation in the history of the Earth. Moscow: GEOS, 2003.

[2] Neruchev S.G. Uran i zhizn' v istorii Zemli. L:Nedra. 1982. 208 s. Uranus and life in the history of the Earth. L: Nedra. 1982. 208 p.

[3] Gomberg M. An instance of trivalent carbon: triphenylmethyl. J. Am. Chem. Soc., vol. 22/issue 11, pp. 757–771, 1900. DOI: 10.1021/ja02049a006

[4] Zavoisky E.K. Spin magnetic resonance in paramagnetics, J.Phys., vol.9, pp 245, 1945. (USSR)

[5] Unger F.G., Andreeva L.N. Fundamentals of oil chemistry. Nature of asphaltenes and resins. Cambridge International Science Publishing. Catalogue o f publications 1999-2000. Access mode: www.demon.co.uk/cambsci/homepage.htm.)

[6] Nanosystems, disperse systems, quantum mechanics, spin chemistry. Compiled by F.G. Unger, Tomsk: TML-Press, Russia, 2010.

[7] Blyumenfel'd L.A., Voyevodskiy V.V., Semenov A.G. Primeneniye EPR v khimii. Novosibirsk. SO AN SSSR.-1962.

[8] Ingram D.J.E. Biological and biochemical application of electron spin resonance. London. Adam Hilger LTD. 1969.

[9] Khasanova N.M., Mouraviev F.A., Galeev A.A., Khasanov R.A., Sitdikova L.M., Paramagnetic properties upper devonian reefs during voronezhskii horizon (conodont scale l.rhenana), 17th SGEM GeoConference on Science and Technologies In Geology, Exploration and Mining, conference proceedings vol. 17/issue 11, pp.407-415, 2017.

[10] Khasanova N.M., Mouraviev F.A., Galeev A.A., Khasanov R.A., Sitdikova L.M., Features of reef formation in the Evlan time of upper devonian sediments by electron paramagnetic resonance, 17th SGEM GeoConference on Science and Technologies In Geology, Exploration and Mining, conference proceedings vol. 17/issue 11, pp.141-148, 2017.

[11] Khasanova N.M., Galeev A.A., Mouraviev F.A., Khasanov R.A., Nizamutdinov N.M. Rhythm of carbonate deposits of the Liven'S horizon on electron paramagnetic resonance data. 18 SGEM. Proceedings, 2018.

[12] Nurgalieva N.G., Anikina E.A., Khassanova N.M. The Tournesian reservoir limestones on core petrophysical and geochemical data (Southern slope of South-Tatarian Arc), Neftyanoye khozyaystvo = Oil industry, 2, pp. 46-48, 2017.

[13] Nurgalieva N.G., Khassanova N.M., Anikina E.A., The Famenian reservoir limestones on core petrophysical and electron spin resonance data (Southern slope of South-Tatarian Arc), Neftyanoye khozyaystvo = Oil industry, 12, pp. 90-93, 2017.